

SECTION 02800
EXTERIOR CONDUIT SYSTEMS

PART 1 - GENERAL

0.1 DESCRIPTION OF WORK

- A.** Work Included: This Section specifies exterior electrical distribution and communications facilities including concrete-encased underground duct banks, conduits, and associated manholes, handboxes, vaults, covers, and appurtenances.
- B.** Exterior conduits and duct banks include, but not limited to, telephone, electric, fire alarm, police signal, traffic signal, cable, communications and lighting.
- C.** Related Work: The following items are not included in this Section and will be performed under the designated Sections:
 - 1. Section 16450 - GROUNDING.
 - 2. Section 2300 - EARTHWORK
 - 3. Section 03300 - CAST-IN-PLACE CONCRETE

0.2 SUBMITTALS

- A.** Submit to both the Engineer and affected utility company for approval, detailed plan and schedule for proceeding with the work. Submit to the Engineer written evidence of utility company's approval of proposed procedure, schedules, and materials.
- B.** Certificates of compliance for conduits and appurtenances.
- C.** Brochures and catalog cuts.
- D.** Conduit location working drawings.
- E.** Samples of all units along with certified engineering data. Upon approval of samples and test data, delivery of the units shall be made. No changes or modifications, with the exception of minor changes not affecting operation or appearance, will be allowed.

0.3 JOB CONDITIONS

- A.** Establish through the Engineer direct and continuous liaison with utility companies who are involved in the indicated work. Verify or determine interface with utility company, and work to be performed and materials to be furnished by utility company.
- B.** The Contractor shall be responsible for necessary coordination and project engineering with the private utility companies and public agencies.

0.4 QUALITY ASSURANCE

- A.** Inspection of the work will be made by the respective utility company involved and the Contractor.
- B.** Notification Point - In the event that the supplier makes a modification or change to the specified unit, or development of a new unit to replace the specified unit, written notification shall be provided to the Engineer. It shall be the Engineer's option to accept delivery of the modified or new unit, or to request the specified unit. In no case shall the delivery of any new or modified unit result in any additional increase in cost to the Authority.

0.5 GUARANTEES/WARRANTIES

- A.** All manufacturers' guarantees against defects in the materials and workmanship shall be transferable to any authorized agency of the local authority or private utility company who shall be responsible for maintenance. Structural defects in the unit shall be cause for complete replacement of the unit. Defects in any component part of the unit, which is covered by the guarantee, may be replaced on an individual basis at the discretion of the Engineer. The cost of such replacement shall be borne by the Contractor. Any defective unit or compound thereof, returned within the guarantee period, shall be replaced by the Contractor who shall make arrangements to return any unit or components thereof, to the manufacturer at the Contractor's expense.
- B.** The warranties that the Contractor receives from each manufacturer of equipment and materials pertinent to the complete and satisfactory operation of each unit included in the Section shall be turned over to the Authority at the time of acceptance of the project, at no cost to the Authority. Each warranty so furnished shall indicate its expiration date and be in effect for a minimum period of one (1) year from the date the units were placed in continuous operation. Warranties shall be transferable to any agency designated by the Authority.
- C.** If, within one (1) year from the date the units are placed in continuous operation, the equipment and materials do not meet the warrants specified above and the Engineer notifies the Contractor or his authorized

representative promptly, the Contractor or his authorized representative thereupon, shall correct any defects either by repairing or replacing any defective part or parts, at no expense to the Authority.

PART 2 - PRODUCTS

0.1 CAST-IN-PLACE CONCRETE

- A. Concrete: Section 03300 - CAST-IN-PLACE CONCRETE, Class 4000-3/4 for manholes, handboxes, and vaults; class as indicted for encasement.

0.2 PRECAST MANHOLE SECTIONS

- A. AASHTO M199.

0.3 CONDUIT AND FITTINGS

- A. Bituminous Fibre: FS W-C-581, Type 1 for concrete encasement, Type II for direct burial, with the following specific requirements:

Nominal Size, Inches	2.0	3.0	4.0
Inside Diameter, Inches Minimum	2.0	3.0	4.0
Wall Thickness, Inches Minimum	0.34	0.39	0.43
Standard Length Feet	5	8	8
Crushing Strength lbs. ft. Minimum	2000	2000	2000
Moisture Absorption Percent Maximum	2	2	2

- B. Galvanized Steel: ANSI C80.1

PART 3 - EXECUTION

0.1 EXCAVATING AND BACKFILLING

- A. Section 02300 - EARTHWORK.

0.2 PLACING DUCTS

- A.** Completely encase underground duct banks in concrete where indicated. Do not use earth forms. Comply with the requirements of ANSI C2, Sections 31 and 32, NFPA 70, and Section 03300 - CAST-IN-PLACE CONCRETE.
- B.** Lay the bottom tier of ducts, using the type of chairs and spacers recommended by the utility company.
- C.** Make tight joints in the duct lines complying with the recommendations of the manufacturer of the jointing compound or coupling. Install rigid metal stub-ups, as indicated, adapted by suitable fittings to individual ducts for stub-up from duct bank to connection to equipment and lighting above grade. Cap stub-up to prevent water, dirt, or debris from entering stub-ups.
- D.** Hold Point - Obtain the Engineer's approval of the installed duct prior to placing the concrete encasement.

0.3 PLACING CONDUIT

- A.** Place conduit for direct burial without encasement only where so indicated. Provide four inch minimum clean sand bedding under conduit and 12 inch minimum sand cover over the conduit.
- B.** Prove the conduit clear by:
 - 1. Rodding and pulling an approved test mandrel from structure to structure; or
 - 2. Blowing an approved device from structure to structure with compressed air.
- C.** Leave a nylon or polyester pull-line in each conduit and cap open ends.

0.4 CONSTRUCTION OF MANHOLES, HANDBOXES, AND VAULTS

- A.** Comply with all requirements of NEC and NESC.
- B.** Install ground rods where indicated in accordance with Section 16450 - GROUNDING.
- C.** Provide drainage facilities for manholes as indicated. If a connection is made to an existing storm drain, install the connection in accordance with the applicable local regulations. Construct other drainage facilities as indicated.

PART 4 - MEASUREMENT AND PAYMENT

0.1 MEASUREMENT

- A.** Concrete encased duct and buried conduit will be measured by the linear foot for each type and size installed.
- B.** Manholes, handboxes and vaults will be measured per each type and size installed.
- C.** Grounding materials will be measured for payment as specified in Section 16450 - GROUNDING.
- D.** Excavating and backfilling, concrete and reinforcement, bedding material, and pull lines will not be separately measured for payment, but costs in connection therewith will be considered incidental to the item of work to which they pertain.

0.2 PAYMENT

- A.** Payment for exterior conduit systems will be made at the Contract unit prices for the quantities determined as specified above.

0.3 PAYMENT ITEMS

ITEM NO.	DESCRIPTION	UNIT
1615.264	2-4" PVC CONDUIT CONCRETE ENCASED	LF
1615.101	3" PVC CONDUIT SCHEDULE 40	LF
1617.600	6-5" PVC CONDUIT CONCRETE ENCASED	LF
1615.276	8-5" PVC CONDUIT CONCRETE ENCASED	LF
1617.550	9-5" DUCT ELECTRIC CONDUIT CONCRETE ENCASED	LF
1617.555	12-5" DUCT ELECTRIC CONDUIT CONCRETE ENCASED	LF
1620.043	RELOCATE EXISTING FEEDER AND MANHOLE	LS
1621.100	ELECTRIC MANHOLE 6'x10'x8'	EA

END OF SECTION

NOTES TO THE DESIGNER

- A.** Any request to modify or waive the specification requirements listed below must be approved in writing by the MBTA's Director of Design:

1. None